

**PARTIAL PREMIX DUAL CIRCUIT FUEL INJECTOR**

**ABSTRACT OF THE DISCLOSURE**

5        A low emission fuel injection system and combustion chamber for use  
in gas turbine engines comprises one fuel injection body having a dual circuit to  
supply both pilot and main fuel systems. Both pilot fuel circuit and a main fuel  
circuit inject fuel at essentially the same axial and radial location. The recessed  
pilot fuel injection site is along the combustor centerline into a swirling air  
10      passage produced by axial air swirlers. The main fuel is injected radially  
through a plurality of injection sites, at a compound angle, into the inner  
diameter of a swirling air passage produced by radial air swirlers. The fuel/air  
residence time prior to entering the combustion chamber is relatively short,  
minimizing the likelihood of auto ignition. During pilot circuit only operation, the  
15      flame is stabilized by a swirler produced recirculation zone, producing high  
temperatures to completely burn the fuel producing low CO and UHC  
emissions. During intermediate and high engine power conditions, both the  
main fuel and pilot circuits discharge fuel into a swirler produced, high air flow,  
recirculation zone producing a fuel lean, low temperature flame to reduce NOx  
20      emissions.